PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improvements in Means for Connecting Service Pipes to Gas Mains

We, BUNN & JOHNSON LIMITED, a Company registered under the laws of Great Britain, of Bury Mead Road, Hitchin, in the County of Hertford, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to means for connecting service pipes to gas mains and is concerned with service pipes and gas mains manufactured from a rigid plastics material.

The object of the invention is to provide improved means which shall make it possible to connect a service pipe to a gas main without it being necessary to interrupt the flow of gas through the main during the operation.

According to the present invention, means for connecting a service pipe of rigid plastics material at a given location to a gas main formed from a similar material comprises a two-part saddle having a first concavely curved part adapted to be placed in position at the given location to embrace a substantial portion of the circumference of the gas main and a second concavely curved part adapted to be placed in position to embrace a substantial portion of the rest of the circumference of the gas main at the given location, clamping means which are each carried by or engageable with the respective pair of adjacent ends of the two parts of the saddle and which are adapted to clamp these parts firmly around the gas main, a straight tubular extension formed on or adapted to be positioned in a gas-tight manner in relation to the first saddle part with the passage in the tubular extension opening into the inner concave face of the first saddle part, a resilient sealing ring arranged between the gas main and the first saddle part to surround the opening of the passage, a tubular branch formed laterally on the tubular extension intermediate the length thereof to receive the end of the service pipe and furnished with means for coupling the pipe thereto in a gas-tight manner, a removable obturating member engageable with the free end of the tubular extension and a cutting tool adapted to pass through the tubular extension, the cutting tool having a screw-threaded part which is engageable with an internal screw-thread formed on the free end of the tubular extension or on a plug inserted in that end of the extension while the obturating member is temporarily removed, and the cutting tool being adapted to cut a hole in the gas main as the said screw-threaded part is screwed along the said internal screw-thread.

Several embodiments of the present invention will now be described by way of example with reference to the accompanying drawings, in which:

Figs. 1 and 2 illustrate a first embodiment, and

Figs. 3, 4 and 5 illustrate parts of three further embodiments of the invention.

Referring first to Fig. 1, the two-part saddle has one strap-like part 1 adapted to be placed in position beneath the gas main 2 and comprising a curved moulding with an inner concave face of a radius slightly longer than that of the external surface of the main. Each end of the part 1 is formed with an out-turned flange 3 along the outer edge of which is formed a depending rib 4 which progressively diminishes in height from one end to the other. The other part 5 of the saddle is also moulded from

a rigid plastics material and has a portion duplicating the strap-like part 1, formed integrally with a tubular T-piece indicated generally at 6. The saddle part 5 is adapted to be placed in position upon the gas main 2 above the strap-like part 1, the respective ends of the two parts 1 and 5 then approaching closely to each other and being symmetrically disposed about a horizontal plane containing the axis of the main 2. The tapered ribs 4 on the two ends of the saddle parts 1 and 5 at either side of the main are oppositely arranged so that a wedging clip 7 of tapering channel shape may be engaged over the lower ends of the ribs 4 and driven along the latter longitudinally of the main to draw the ends of the saddle parts 1 and 5 together and thus clamp these parts tightly around the main.

The tubular T-piece 6 on the upper saddle part 5 has its cross-piece 8 disposed at right angles to the outer surface of the strap-like portion of this part so that its shank 9 extends to one side of the axis of the main. The passage through the cross-piece opens into the concave inner surface of the saddle part 5 and this surface is formed with an annular groove surrounding the end of the passage into which groove is cemented an elastic sealing ring 10 adapted to be compressed against the outer surface of the main 2 when the saddle parts 1 and 5 are clamped together around the latter.

At its outer end, the cross-piece 8 of the T is internally screw-threaded at 11 to receive a screw-plug 12 having a hexagonal head adapted to contact a sealing ring 13 cemented in a groove formed in the end face of the cross-piece. The outer end of the shank 9 of the T-piece is internally coned at 14 and externally screw-threaded at 15 so that a service pipe 16 may be connected thereto in the usual way by inserting the pipe end into the passage and tightening a union nut 17 on the threaded end to force an elastic packing ring 18 into the tapering space between the external surface of the pipe 16 and the conical internal surface 14 of the shank 9.

As a separate element (see Fig. 2) there is provided a tool 19 having a head 20 with cutting edges 21 adapted to pass with small clearance through the passage in the cross-piece 8 of the T-piece 6, a shank 22 formed intermediate of its length with a collar 23 having an external screw-thread adapted to engage the internal thread 11 at the outer end of the crosspiece 8, and a handle 24 secured transversely at the outer end of this shank. The dimensions are such that when the collar 23 has just been entered into the thread 11 in the cross-piece 8, the cutting edges 21 on the head 20 of the tool are in contact with the outer surface of the gas main 2. Hence, as the tool 19 is screwed home the cutting edges 21 form a hole through the wall of the main which is of substantially the same diameter as the passage through the cross-piece.

The manner in which the connecting means illustrated in Figs. 1 and 2 is employed will be clear from the following brief description.

The saddle parts 1 and 5 are clamped around the gas main 2 at the required location and the service pipe 16 is coupled to the shank 9 of the T-piece 6 after the screw-plug 12 in the end of the cross-piece 8 has been removed. The service to be connected is then tested in the prescribed manner by pumping air into the upper end of the cross-piece 8 of the T and noting any loss of pressure. If the service is leak-free, the air-supplying connection is removed and the tool 19 is screwed into the upper end of the cross-piece 8 to cut a hole 25 in the wall of the main 2 within the area surrounded by the sealing ring bearing on this wall. The tool is then unscrewed and removed and the screw-plug 12 quickly replaced in the upper end of the cross-piece 8.

It will be understood that the tool 19 may be modified so that the disc cut out of the wall of the main 2 may be extracted with the tool instead of being allowed to fall into the main. For example, the tool may be formed with an axial passage through which extends a rod (adequately sealed) having a gimlet end for screwing into the wall of the main before the cutting operation is performed. The cut-out disc then remains engaged with the rod and can be extracted with the tool. An alternative modification of the hole-cutting tool is illustrated in Fig. 3, where it will be seen that the cutting head 20 is screw-threadedly attached to the shank 22 at 26 and is provided with an internal screw-thread at 27. Instead of having an externally screw-threaded collar 23 as in the tool of Fig. 2, the tool shown in Fig. 3 is provided with a screw-threaded portion 28 on its shank, and the thread 28 is engageable with a similar internal screw-thread on a tubular plug 29. The plug 29 is itself screwed at 30 to the outer end of the cross-piece 8 and the pitch of the screw-thread at 30 is appreciably coarser than that of the threads at 27 and 28. As the tool is screwed along the internal threaded portion of the plug 29, its cutting edges 21 cut a hole in the wall of the main 2 and the resulting circular slug of main material is drawn up during rotation of the cutting head 20 into the threaded interior of the latter. The plug 29 is then withdrawn from engagement with the cross-piece 8, taking with it the cutting tool and the slug of main material, and a screw-plug (such as that shown at 12 in Fig. 1) is

quickly replaced in the upper end of the cross-piece. The cutting head 20 can then be unscrewed from the shank 22 and the slug pushed out from the interior of the cutting head.

Apart from this modification of the hole-cutting tool, the embodiment shown in Fig. 3 differs in one other important respect from the embodiment described with reference to Figs. 1 and 2, namely that the tubular T-piece is a separate element and is not formed integrally with the saddle part 5. It will be seen from Fig. 3 that the inner end of the cross-piece 8 is formed with an external screw-thread 31, and this is a swivel thread so that when screwed in to an annular neck 32 formed in the saddle part 5 the T-piece 6 can be pivoted thereabout until the shank 9 of the T-piece is aligned in the required direction for the service pipe (not shown in Fig. 3). It will be appreciated, then, that in this embodiment the service pipe can be branched off at any required angle from the gas main. When the required angle has been attained, a lock nut 33 is tightened on the screw-thread 31; the nut 33 bears against a gasket 34 which is internally shaped to define, with the outer screw-threaded wall of the cross-piece 8, an annular space accommodating a resilient sealing ring 35.

The saddle parts and clamping means of the embodiment of Fig. 3 are the same as those shown at 1, 5 and 7 respectively in Fig. 1. However Figs. 4 and 5 show alternative constructions of saddle parts and clamping means.

Referring first to Fig. 4, this shows an arrangement in which the two saddle parts, 1*a* and 5*a*, are adapted to be clamped around the gas main 2 by use of the toggle principle. The parts 1*a* and 5*a* are made separately and are assembled around the main, with a pin 36 on the part 5*a* supporting a curved end portion 37 on the part 1*a*. A toggle lever 38 is pivotally mounted on the other end of the saddle part 1*a* and carries a pin 39 about which an element 40 is pivotable. The free end of the element 40 is ball- or roller-shaped and is engageable with a curved surface 41 formed near the adjacent end of the saddle part 5*a*. When the parts 1*a* and 5*a* have been loosely assembled around the main at the required location, the toggle lever 38 is moved towards the neck 32 (i.e. into the position shown in Fig. 4) to draw the two saddle parts more closely together and into clamping engagement with the main.

The embodiment illustrated in Fig. 4 is otherwise identical to that shown in Fig. 3.

Referring now to Fig. 5, it will be seen that here each of the saddle parts 1*b* and 5*b*, is formed at each end with a half-rounded protuberance 42 having a flat side surface 43. The rounded surface of each protuberance tapers in the direction of its length and is provided with a screw-thread. The parts 1*b* and 5*b* are assembled around the main 2 so that at each end of the saddle there is a pair of protuberances 42 with the flat surfaces 43 of each pair facing each other. A nut 44 having an internal taper corresponding to that on the rounded surfaces of the protuberances 42 is then screwed on to each pair of protuberances, thus drawing the protuberances towards each other and the saddle parts into clamping engagement with the main.

The embodiment of Fig. 5 is otherwise identical to that of Fig. 3.

The saddle parts of all four embodiments described herein may be made either of gunmetal or of a rigid plastics material.

WHAT WE CLAIM IS:—

1. Means for connecting a service pipe of rigid plastics material at a given location to a gas main formed from a similar material, comprising a two-part saddle having a first concavely curved part adapted to be placed in position at the given location to embrace a substantial portion of the circumference of the gas main at the given location, and a second concavely curved part adapted to be placed in position to embrace a substantial portion of the rest of the circumference of the gas main at the given location, clamping means which are each carried by or engageable with the respective pair of adjacent ends of the two parts of the saddle and which are adapted to clamp these parts firmly around the gas main, a straight tubular extension formed on or adapted to be positioned in a gas-tight manner in relation to the first saddle part with the passage in the tubular extension opening into the inner concave face of the first saddle part, a resilient sealing ring arranged between the gas main and the first saddle part to surround the opening of the passage, a tubular branch formed laterally on the tubular extension intermediate the length thereof to receive the end of the service pipe and furnished with means for coupling the pipe thereto in a gas-tight manner, a removable obturating member engageable with the free end of the tubular extension and a cutting tool adapted to pass through the tubular extension, the cutting tool having a screw-threaded part which is engageable with an internal screw-thread formed on the free end of the tubular extension or on a plug inserted in that end of the extension while the obturating member is temporarily removed, and the cutting tool being adapted to cut a hole in the gas main as the said screw-threaded part is screwed along the said internal screw-thread.

2. Connecting means according to claim 1, wherein each of the saddle parts is formed at each of its ends with an outwardly directed radial flange along the outer edge of which is formed a tapering rib set substantially at right-angles to the associated radial flange, and wherein each clamping means is a wedging clip of tapering channel shape engageable over the respective pair of adjacent ribs of the two saddle parts and drivable along the ribs longitudinally of the gas main to effect the said clamping of the saddle parts around the main.

3. Connecting means according to claim 1 or claim 2, wherein a cutting head carried by the cutting tool is annular in shape and has metal cutting teeth regularly spaced around the free end of the annulus.

4. Connecting means according to claim 3, wherein the said internal screw-thread is formed on the said plug and the plug is also provided with an external screw-thread for engagement with the free end of the tubular extension, the external screw-thread on the plug being of coarser pitch than the said internal screw-thread.

5. Connecting means according to claim 4, wherein the inner annular surface of the cutting head is also formed with a screw-thread so that the circular portion of the gas main which is cut away to form the hole can ride up the screw-thread on the cutting head during the cutting operation and be retained thereby until the cutting tool is removed from the tubular extension, the screw-thread on the cutting head being of finer pitch than the external screw-thread on the plug.

6. Connecting means according to claim 1, or to any one of claims 3, 4 and 5 when not appendant to claim 2, wherein the clamping means comprise toggle means carried by the saddle parts.

7. Connecting means according to claim 1, or to any one of claims 3, 4, and 5 when not appendant to claim 2, wherein each of the saddle parts is formed at each of its ends with a half-rounded protuberance having a flat side surface, the rounded surface of each protuberance tapering in the direction of its length and being screw-threaded so that when the two saddle parts are assembled around the gas main, with the flat side surfaces of adjacent protuberances directed towards each other, the saddle parts may be drawn towards each other by means of a correspondingly tapered, internally screw-threaded nut engaged over each pair of mutually adjacent protuberances.

8. Means for connecting a service pipe of rigid plastics material at a given location to a gas main formed from a similar material, substantially as herein described with reference to Figs. 1 and 2, Fig. 3, Fig. 4 or Fig. 5 of the accompanying drawings.

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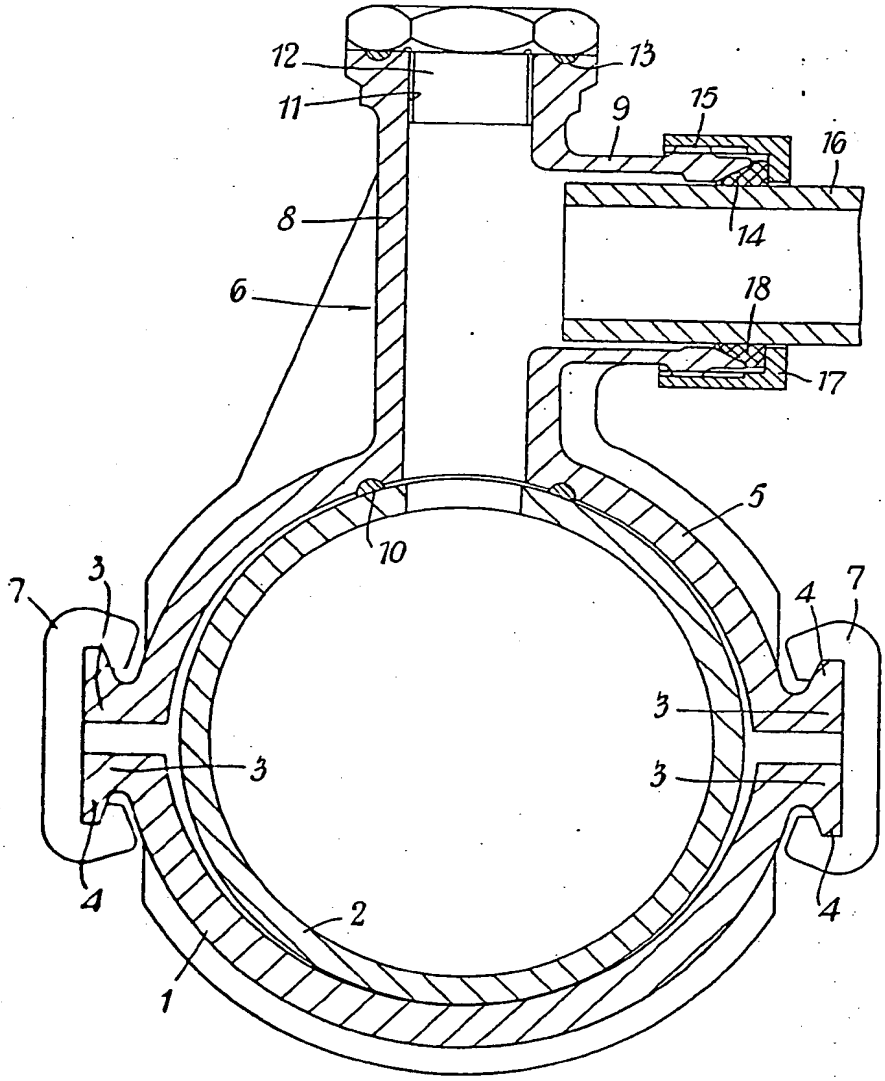
FIG.1



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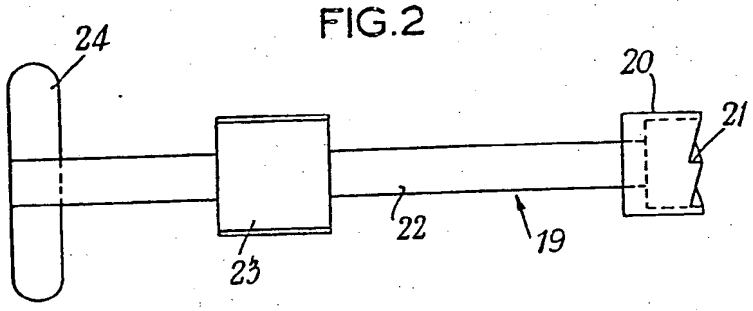
4 SHEETS This drawing is a reproduction of the Original on a reduced scale
Sheets 1 & 2

FIG.2



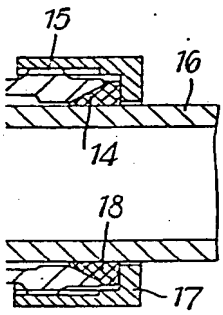
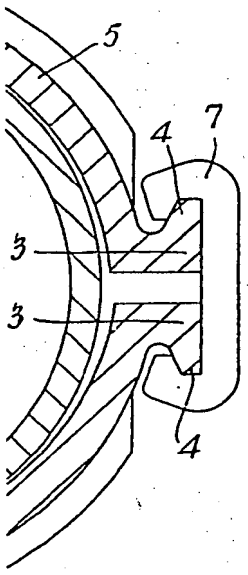


FIG.5



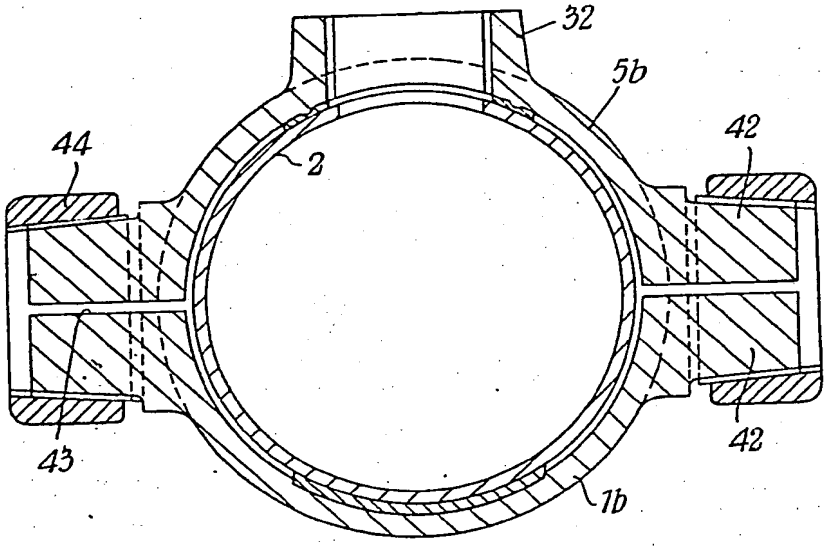


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FIG.1

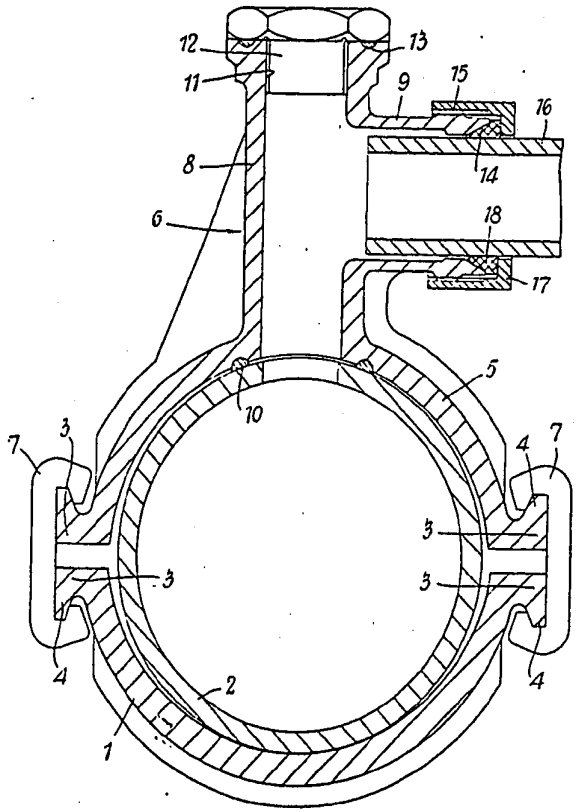


FIG.2

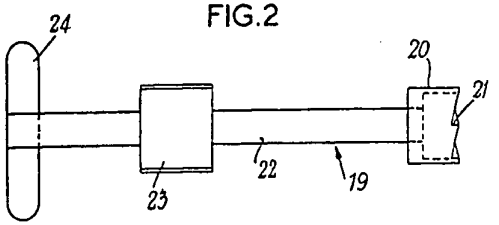
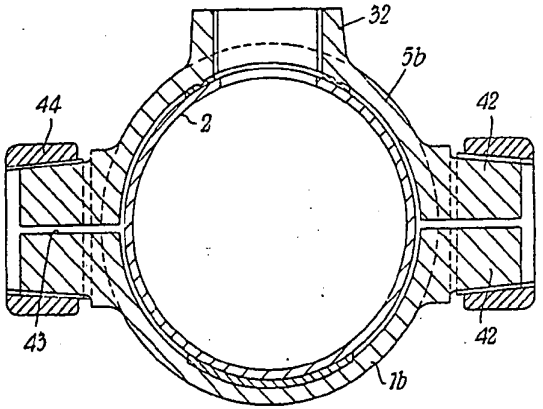


FIG.5



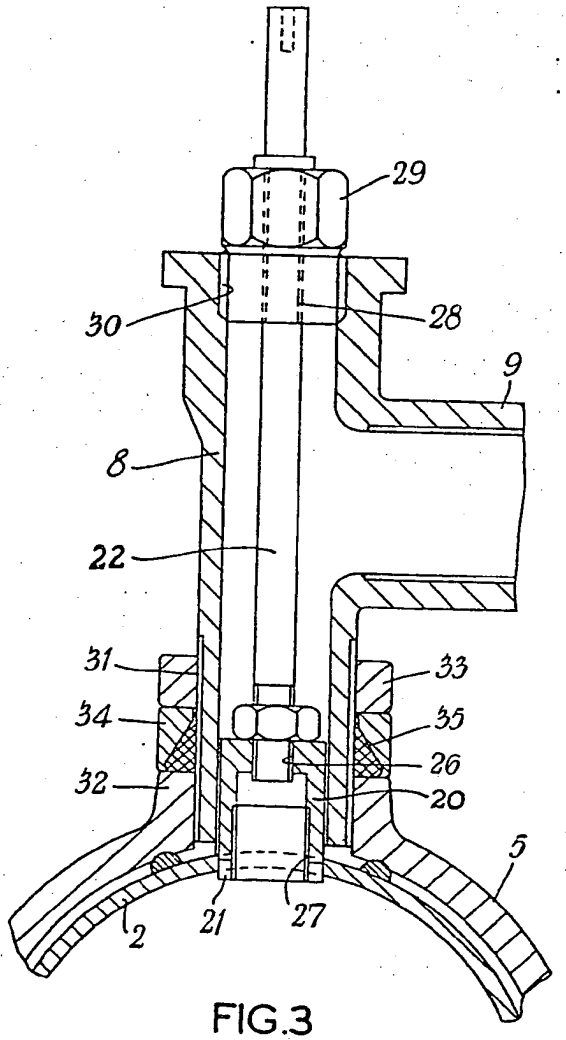


FIG.3

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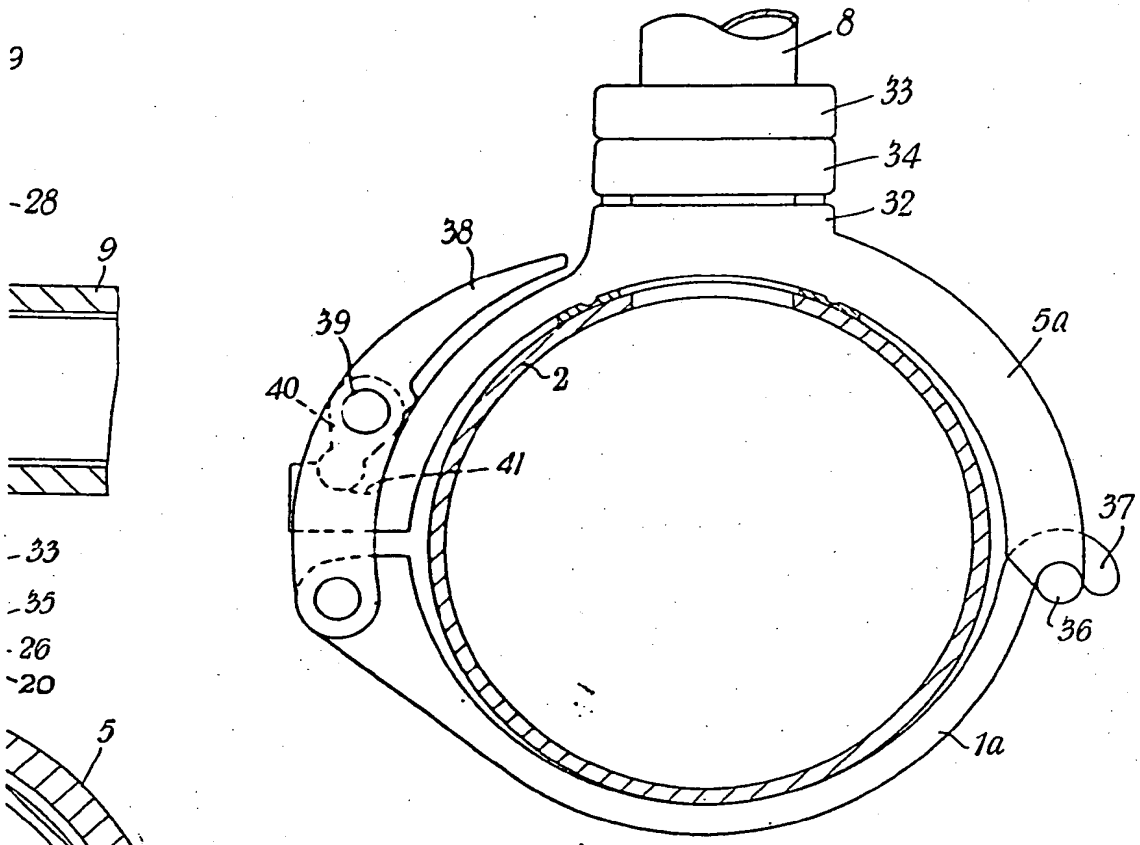
FIG.4



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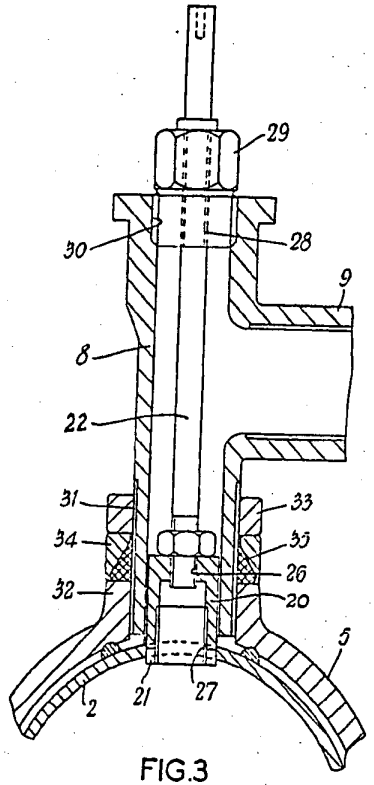

FIG.3

FIG.4